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10/616,292	07/10/2003	Ari Hottinen	60091.00171	1589

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EXAMINER	
ZEWDU, MELESS NMN	
ART UNIT	**PAPER NUMBER**
2617	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/19/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/616,292	HOTTINEN, ARI	
	Examiner	Art Unit	
	Meless N. Zewdu	2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 October 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-65* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17,19-51 and 53-65* is/are rejected.

7)☒ Claim(s) *18 and 52* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This action is in response to the communication filed on 10/24/06.

2. Claims 60-65 have been added.

3. Claims 1-65 are pending in this action.

The indicated allowability of claims 18 and 52 is withdrawn in view of the newly discovered reference(s) to ***. Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 103

Claims 1-3, 5-12, 15, 17, 19, 23-25, 29, 31-32, 34-45, 49, 51, 53 and 57-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wax et al. (Wax) (US 6,249,680 B1) in views of Iwamura et al. (Iwamura) (US 2005/0009528 A1).

As per claim 1: Wax discloses a method for performing positioning in a radio system (see abstract), the method comprising:

transmitting at least one signal to at least two different channels, each signal being suitable for channel estimation (see abstract; figs. 1, 4 and 6; col. 4, lines 21-49);

receiving, in a receiver, said at least one signal through at least two different channels (see abstract);

estimating on the basis of said at least one received signal from the at least two different channels, a spatial signature of the channels (see abstract), and

defining, on the basis of the spatial signature, information related to the location of a receiver or a transmitter of the at least one signal (see abstract). But, Wax does not

explicitly teach about at least one identifier (channel or signal identifier), as claimed by applicant. However, in the same field of endeavor, Iwamura et al. (Iwamura) teaches about channel identifier assigning method and mobile communication system, wherein sectors (base stations) are assigned channel identifiers which they in turn send/provide them to mobile stations (see paragraphs 0015, 0026, 0029, 0030, 0032). Note: when Wax's reference is provided/modified with Iwamura's channel identifier, Wax's estimation of the spatial signature will be based on channels identified by the channel identifier/s, according to the teaching of Iwamura. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to assign/provide channel identifier/s to mobile stations for the advantage of a mobile station to reduce power conception or time required to carry out neighborhood cell search (see paragraph (0014).

As per claim 2: Wax discloses a method, further comprising: defining as the information related to the location at least one direction between the receiver and transmitter based on the spatial signature of the signals (see abstract; col. 4, lines 21-49).

As per claim 3: Wax discloses a method, further comprising, defining the information related to the location by comparing an estimated spatial signature with known spatial signatures and defining as the location a position whose known spatial signature is closest to the estimated spatial signature (see abstract; col. 4, lines 21-49, lines 50-65).

As per claim 5: Wax discloses a method, further comprising: defining the information related to the location according to the map coordinate system when the location of at

least the transmitter or receiver is specified in a map coordinate system (see col. 12, lines 15-31).

As per claim 6: Wax discloses a method, further comprising: forming the spatial signature by utilizing several channel estimate matrices generated at different time instants (see (see claims 4-6; col. 9, line 44-col. 10, line 31).

As per claim 7: Wax discloses a method, further comprising: forming the spatial signature by utilizing several channel estimate matrices generated on different frequencies (see col. 8, lines 9-28).

As per claim 8: Wax discloses a method, further comprising: forming the spatial signature by utilizing several channel estimate matrices calculated from different reception antennas (see fig. 4; 5, line 49-col. 6, line 18).

As per claim 9: Wax discloses a method, further comprising: generating at least one covariance matrix of at least one channel and forming the spatial signature by means of at least one specific vector of the covariance matrix (see claims 3-6; col. 8, lines 9-28).

As per claim 10: Wax discloses a method, further comprising: generating a singular value decomposition for a channel estimate matrix, by means of which specific value vectors of the covariance matrix are defined for the definition of the information related to the location (see claims 4-6; col. 8, lines 9-28).

As per claim 11: Wax teaches a method, defining a first dominant delay path by utilizing specific values of the channel covariance matrix calculated for different delay paths or the channel singular values in such a manner that the dominant delay path is the path having the highest specific value energy (see col. 8, lines 9-28).

As per claim 12: Wax discloses a method, further comprising: defining a first delay path whose specific value energy exceeds a predefined threshold value (see abstract). Examiner considers the calibrated signal signatures as threshold/s.

As per claim 15: Wax discloses a method, wherein in the receiving of said at least two identifier signals, the identifier signals are at least partly uncorrelated (see col. 4, lines 21-49). Polarized signals/channels are uncorrelated.

As per claim 17: Wax discloses a method, using the elements or parameters of the channel estimate corresponding to the shortest delay in the spatial signature of the signals (see col. 5, lines 5-23; col. 6, lines 48-52).

As per claim 19: Wax teaches a method, generating the identifier/code signals by coding the signals to be substantially non-interfering to each other (see col. 4, lines 21-49).

As per claim 23: Wax discloses a method, further comprising: signaling the spatial signatures or the parameters of the spatial signatures of the received signals to a base station and defining the location of the terminal in the network part of the radio system (see col. 6, lines 24-36).

As per claim 24: Wax discloses a method, further comprising: using one or more base stations in defining the location of the terminal (see col. 9, lines 21-41).

As per claim 25: Wax discloses a method, further comprising: calculating the received power based on the spatial signature of the signals and maximizing the received power in relation to the transmission direction for the purpose of defining the information

related to the location between the transmitter and receiver (see col. 4, lines 21-65; col. 11, line 62-col. 12, line 14).

As per claim 29: Wax teaches a method, wherein the identifier signals are channel specific training sequences (see abstract; col. 6, lines 1-18).

As per claim 31: the features of claim 31 are similar to the features of claim 1, except claim 31 is directed to a system/means for performing the steps of method claim 1. Hence, the system/means is required by the method, claim 31 is rejected on the same ground and motivation as claim 1.

As per claim 32: the feature of claim 32 is similar to the feature of claim 2. Hence, claim 32 is rejected on the same ground and motivation as claim 2.

As per claim 34: the feature of claim 34 is similar to the feature of claim 3. Hence, claim 34 is rejected on the same ground and motivation as claim 3.

As per claim 35: the feature of claim 35 is similar to the feature of claim 5. Hence, claim 35 is rejected on the same ground and motivation as claim 5.

As per claim 36: the feature of claim 36 is similar to the feature of claim 6. Hence, claim 36 is rejected on the same ground and motivation as claim 6.

As per claim 37: the feature of claim 37 is similar to the feature of claim 7. Hence, claim 37 is rejected on the same ground and motivation as claim 7.

As per claim 38: the feature of claim 38 is similar to the feature of claim 8. Hence, claim 38 is rejected on the same ground and motivation as claim 8.

As per claim 39: the feature of claim 39 is similar to the feature of claim 9. Hence, claim 39 is rejected on the same ground and motivation as claim 9.

As per claim 40: the feature of claim 40 is similar to the feature of claim 10. Hence, claim 40 is rejected on the same ground and motivation as claim 10.

As per claim 41: the feature of claim 41 is similar to the feature of claim 11. Hence, claim 41 is rejected on the same ground and motivation as claim 11.

As per claim 42: the feature of claim 42 is similar to the feature of claim 12. Hence, claim 42 is rejected on the same ground and motivation as claim 12.

As per claim 43: the feature of claim 43 is similar to the feature of claim 13. Hence, claim 43 is rejected on the same g round and motivation as claim 13.

As per claim 44: the feature of claim 44 is similar to the feature of claim 14. Hence, claim 44 is rejected on the same ground and motivation as claim 14.

As per claim 45: the feature of claim 45 is similar to the feature of claim 15. Hence, claim 45 is rejected on the same ground and motivation as claim 15.

As per claim 49: the feature of claim 49 is similar to the feature of claim 29. Hence, claim 49 is rejected on the same ground and motivation as claim 29. Furthermore, a signature represents specific training sequence.

As per claim 51: the feature of claim 51 is similar to the feature of claim 17. Hence, claim 51 is rejected on the same ground and motivation as claim 17.

As per claim 53: the feature of claim 53 is similar to the feature of claim 19. Hence, claim 53 is rejected on the same ground and motivation as claim 19.

As per claim 57: Wax discloses a radio system, wherein the terminal is further configured to signal the spatial signatures or the parameters of the spatial signatures of

the received signals to the base station and to define the location of the terminal in the network part of the radio system (see col. 4, lines 21-65).

As per claim 58: the feature of claim 58 is similar to the feature of claim 24. Hence, claim 58 is rejected on the same ground and motivation as claim 24.

As per claim 59: the feature of claim 59 is similar to the feature of claim 25. Hence, claim 59 is rejected on the same ground and motivation as claim 59.

As per claim 60: the features of claim 60 are similar to the features of claim 1. Hence, claim 60 is rejected on the same ground and motivation as claim 1.

Claims 4, 16, 20, 33, 46 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wax applied to claims 1 and 31 above, and further in view of Paulraj et al. (Paulraj) (US 6,351,499 B1).

As per claim 4: but, Wax does not explicitly teach about transmitting an identifier from at least two different antenna elements in order to transmit the identifier signals through at least two different channels; in other words, Wax is silent as whether the signals received by the rake receiver of the base station were transmitted from a transmitter with two antennas, as claimed by applicant. However, in a related field of endeavor, paulraj teaches about a communication system wherein both the transmitter and receiver are exchanging signals/communication via multiple antennas (using M and N antennas respectively) (see figs. 1 and 2; col. 3, lines 42-58; col. 4, lines 33-45). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to further modify the above references with the teaching of Paulraj

for the advantage of maximizing signal quality or throughput of a channel between a transmit and receive unit (see col. col. 3, lines 43-52).

As per claim 16: Paulraj teaches about a method, wherein the receiving of said at least two identifier signals, the identifier signals are orthogonal (see col. 8, lines 47-67). Motivation is same as provided in the rejection of claim 4.

As per claim 20: the feature of claim 20 is similar to the feature of claim 4. Paulraj's reference includes FDMA (different frequencies) (see col. 4, lines 26-32). Therefore, claim 20 is rejected on the same ground and motivation as claim 4.

As per claim 33: the feature of claim 33 is similar to the feature of claim 4. Hence, claim 33 is rejected on the same g round and motivation as claim 4.

As per claim 46: the feature of claim 46 is similar to the feature of claim 16. Hence, claim 46 is rejected on the same ground and motivation as claim 16.

As per claim 54: the feature of claim 54 is similar to the feature of claim 4. In that, the different paths provided in Paulraj require different channels/frequencies. Therefore, claim 54 is rejected on the same ground and motivation as claim 4.

Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wax as applied to claim 1 above, and further in view of Grubeck et al. (Grubeck) (US 6,009,334).

As per claim 13: but, Wax does not explicitly teach about measuring direction of arrival (DOA) and angle of arrival (AOA) for purpose of comparing direction of reception, as claimed by applicant. However, in the same field of endeavor, Grubeck teaches a

method of, utilizing additionally in the positioning at least one of the following measurements:

defining the direction of arrival as a DOA measurement (see at least, col. 1, line 55-col. 2, line 10; col. 6, lines 16-52). The required feature, the at least one measurement, is satisfied by the prior art's DOA measurement. Furthermore, the prior art's ('334) line of sight (LOS) selection, which is a function of direction), obviates the claimed feature of comparing the direction of reception and transmission signals with each other. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the teaching of Wax with that of Grubeck for the advantage of more accurately determining distance and/or the position of a mobile radio terminal (see col. 1, lines 8-11; col. 1, lines 21-48).

As per claim 14: Grubeck teaches a method, utilizing additionally in the positioning at least one of the following measurements:

measuring the time of arrival as a TOA measurement (see col. 6, lines 7-52),

measuring the time difference of arrival as a TDOA measurement (see col. 6, lines 7-52),

for the purpose of defining the distance between the transmitter and receiver (see col. 1, lines 48-55). Motivation is same as provided in the rejection of claim 13.

Claims 21-22, 26-28, 47-48 and 55-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references applied to claims 1 and 31 above, and further in view of Cedervall et al. (Cedervall) (US 6,011,974).

As per claim 21: Wax does not explicitly teach about a method wherein a terminal serves as the receiver and perform its own position, as claimed by applicant. However, in a the same field of endeavor, Cedervall teaches about a system and method for determining position of a cellular mobile terminal wherein the mobile terminal is provided with means to determine its own position (see col. 4, line 56-col. 5, line 23). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to further modify the above references for the advantage of providing an improved method and system for determining the position of a mobile radio terminal (see col. 1, lines 7-10).

As per claim 22: Cedervall teaches a method, further comprising signaling necessary information (could be any usable information) on the antenna structure or antenna element location of the base station to the terminal (see col. 8, lines 18-36).

As per claim 26: the feature of claim 26 is similar to the feature of claim 21. Hence, claim 26 is rejected on the same ground and motivation as claim 21.

As per claim 27: Cedervall teaches a method, wherein the identifier signals are broadcast signals (see col.3, lines 37-67, particularly, lines 454-52). A signal from one source to many is a broadcast.

As per claim 28: Cedervall teaches a method, wherein the identifier signals are common pilot channel signals of a WCDMA radio system (see col. 2, lines 47-52; col. 2, lines 37-67; col. 7, lines 27-47).

As per claim 47: the feature of claim 47 is similar to the feature of claim 27. Hence, claim 47 is rejected on the same ground and motivation as claim 47.

As per claim 48: the feature of claim 48 is similar to the feature of claim 28. Hence, claim 48 is rejected on the same ground and motivation as claim 28.

As per claim 55: the feature of claim 55 is similar to the feature of claim 21. Hence, claim 55 is rejected on the same ground and motivation as claim 21.

As per claim 56: the feature of claim 56 is similar to the feature of claim 22. Hence, claim 56 is rejected on the same ground and motivation as claim 22.

Claim 18, 30, 52 and 61-65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wax in view of Iwamura and further in view of Hotteinen et al., © 2000. For examination purpose, claim 61 is considered first.

As per claim 61: the features of claim 61 are similar to the features of claim `1, except the transmitter antenna is reuired to have at least two antenna elements, as claimed by applicant, and which is taught by Hottinen which provides two transmit antenna elements (see page 70-73). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made modify Wax in vie Iwamura with the teaching of Hottinen for the advantage of satisfying the need of transmit diversity in the 3G systems (see introduction).

As per claim 62: the features of claim 62 are similar to the features of claim 61. Hence, claim 62 is rejected on the same ground and motivation as claim 61.

As per claim 63: some of the features of claim 63 are similar to the features of claim 62s and 1. The difference feature wherein the a receiver (other than the base) to estimate a spatial signature is taught by Hottinen et al. (see page 72). Hence, claim 63 is rejected on the same ground and motivation as claim 61.

As per claim 64: the features of claim 64 are similar to the features of claim 61. Hence claim 64 is rejected on the same ground and motivation as claim 61.

As per claim 65: the features of claim 65 are similar to the features of claim 61. Hence, claim 65 is rejected on the same ground and motivation as claim 61.

As per claim 30: Hottinen teaches a method, wherein the identifier (identifier is provided above) signals are transmitted on a dedicated (see at least page 71, second column). Motivation is same as provided in the rejection of claim 61.

As per claim 18: Hottinen teaches a method a method, further comprising generating the identifier signals in such a manner that the signals are transmitted from the different antenna elements at different times (see page 72, first column). A reference is made, particularly, to time –orthogonality. Motivation is as provided in the rejection of claim 61 above.

As per claim 50: the feature of claim 50 is similar to the feature of claim 30. Hence, claim 30 is rejected on the same ground and motivation as claim 30.

As per claim 52: the feature of claim 52 is similar to the feature of claim 18. Hence, claim 52 is rejected on the same ground and motivation as claim 18>

Response to Arguments

Applicant's arguments with respect to claims 1-59 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Meless N. Zewdu whose telephone number is (571) 272-7873. The examiner can normally be reached on 8:30 am to 5:00 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Appiah, Charles can be ached on (571) 272-7904. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Any inquiry of a general nature relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-2600.

Meless Zewdu

Examiner

11 January 2007.